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# Construct and Psychometric Properties of a New Version Quality of Life Scale Based on Choice Theory

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## Abstract

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**Abbreviations:** QOLSCT = quality of life scale based on choice theory; GHQ = general health questionnaire; SF36 = short form 36; SD = standard deviation; RMSEA = The root mean square error of approximation; CFI = comparative fit index; NFI = Normed Fit Index

**BACKGROUND:** Choice theory, as a psychopathological model, postulated five basics, genetically and universally, needs. Accordingly, the rate of everybody happiness and quality of life is depended on the number of his needs fulfilling. Although some scales have been constructed to assess basic needs, they have proposed unity of needs for all human.

**AIM:** The present study was designed to construct a new scale, considering individualisation needs for each person; quality of life scale based on choice theory (QOLSCT).

**METHODS:** Using cluster sampling, six hundred (49% female and 51% male) postgraduate students were selected. One hundred fifty participants also filled SF-36 and GHQ, and 80 participants refilled QOLSCT with four weeks' interval again.

**RESULTS:** Cronbach's alpha, split-half and test re-test (one month) reliability scores were 0.78, 0.75, and 0.92 successively. The correlation between items and total scores range from 0.36 to 0.72, all with P values  $\geq 0.0001$ . Confirmatory factor analysis showed satisfactory values of goodness-of-fit indices, RMSEA, CFI, NFI and GFI were, 0.05, 0.99, 0.99 and 0.99 respectively. Convergent and divergent validity also showed significant correlations.

**CONCLUSION:** The result of the present study showed that the new version of quality of life scale based on choice theory could be confirmed. The good level of reliability, fairly goodness of fit indexes, and very good convergent validity support this idea.

## Introduction

Quality of life is a concept and term that has been discussed in various guises throughout history [1]. However, it is a debatable, broad, and multi-level term and appears to be a complex collection of amorphous objective and subjective dimensions [2]. In health psychology literature, there are a variety of definitions about the quality of life [3]. Satisfactory with life and fulfilling of needs are the most important domains in the majority of these definitions [4], [5], [6], [7], [8]. For example, Shin and Johnson [6] defined the quality of life as a concept consists of possession resources needed to satisfy individual needs, wants and desires, participation in an activity that improve

personal development, self-actualisation, and satisfaction with self in comparison to others.

Several scales have been developed to measure the concept of quality of life [1], [2], [4], [9], [10], [11], [12], [13]. For developing a scale, at first, each investigator established a model and accordingly selected appropriated items [9]. These scales, generic or specific, they have been applied as an instrument mostly for medical practice, improving the doctor-patient relationship, assessing and comparison of different effectiveness treatments, mental and physical health evaluations, and research and policy makings [12].

Choice theory, as a psychopathological model, postulated a variety idea about human nature,

mental health, psychotherapy, working with couples, and school children [14]. Definitively, for an investigation in this area (especially for assessment of treatment, mental health and every interventional program) merit and valid instrument have to be needed. As mentioned above, each scale and its items will be derived from the fundamental ideas in every model.

Glasser [14] as the founder of choice theory proposed that human being possesses five basic genetically and universally, needs [15], [16], [17], [18]. All of the human behaviours are driven by these five needs: survival, power, belonging, freedom and fun. Accordingly, behind all behaviour is an attempt to satisfy one or more of these needs [19]. Failure to satisfy these needs is equal to symptoms or mental health abnormalities. In contrast, effective and successful satisfactory of these needs resulted in a feeling of control, happiness and quality of life [18], [19]. In other words, the rate of everybody happiness and quality of life is depended on the amount of his/her needs fulfilling. Therefore, for assessment of everybody quality of life, according to choice theory, we need to assess his/her degree of needs satisfaction and fulfilling. A few scales have been developed and used to measure basic needs satisfactory according to choice theory [16], [17], [20], [21], [22], [23], [24], [25], [26], [27]. Glasser [15] believes that every person has a unique profile of basic needs. In another hand, in attention to the unity of each person quality of life, more recent approach to quality of life is individualised measures [5], [28], [29], [30], [31], [32]. The most important problems with previous scales, especially in choice theory area, could be none serious attention to this individualisation. In other words, all of these scales have posited the same degree of needs intensity in everybody. Also, a tendency toward brief and short form scale, especially in structural equation models, has been increasingly popular in recent years [30], [31], [33], [34].

This research was established to develop and assess psychometric properties of a new quality of life scale according to choice theory with adaptation a new system of individually based on the quality of life inventory [28], [29], [35]. Ultimately the aim was to construct an instrument to use in the assessment of the quality of life in people according to choice theory (QOLSCT) with mentioned proposes.

## Methods

### *Participants*

After confirming the research proposal by the Research Ethics Committee of Yasuj University of medical sciences, six hundred (49% female and 51%

male) postgraduate students were selected by cluster sampling. Informed consent was obtained from all individual participants included in the study. Participants' mean age was 28.62 years (SD = 7.34; range: 18-53 years). According to gender, the mean age was 27.01 ± 6.7/for female and 30.16 ± 7.61 for a male. Of the initials sample, 150 participants also filled SF- 36 and GHQ. All of the participants were studying at postgraduate levels (MA and PhD) in Azad University of Kohgiluyeh and Boyer Ahmad (a province in the south of Iran).

### *Short-form 36 health survey (SF-36)*

SF-36 is a generic and self-administrated instrument widely used to measure health-related quality of life [36]. It consists of 36 questions (items), and the scores are summarised into eight subscales, and a total score of quality of life ranged 0 to100. In this scale, the higher scores indicating higher levels of function and/or better health. The Iranian version of the SF-36 used in this study has been provided for use in the Persian language [37].

### *General health questionnaire (GHQ-28)*

The GHQ-28 was included to test the divergent validity of the translated version of QOLSCT. The GHQ-28 is a self-administered screening instrument aimed at detecting those with diagnosable psychiatric disorders [38, 39]. The GHQ-28 provides four scores on somatic symptoms, anxiety and insomnia, social dysfunction and severe depression (seven items for each dimension). Items may be scored using 0-1-2-3 Likert scores (at present study), or they may be scored 0-0-1-1, which indicates whether a symptom is absent or present.

### *Procedure*

At the first step, we needed to prepare some items for sale, according to Choice theory basic needs (survival, belonging, power, freedom, and fun), using Brown Model [40] and Spector design [41]. A literature review was done on Glasser books [14], [16], [19], [22], [42], Wubbolding book [18], LaFond [25], Burns et al., [21], Mason et al., [26]and Sing and Jusoh [27] papers to determine basic needs in choice theory and history of works done to make measurable Glasser idea about basic needs. Using the Brown Model [40] and Spector design [41], items were built. In the calculation, a total of ten items (five pairs) were constructed for the assessment of basic needs.

We adopted The Quality of Life Inventory [28], [29], [35] method to overcome previous biases [5], [35] in present scales. Accordingly, we advocated two items for each basic need. In first group items (n1-1, n2-1, n3-1, n4-1, and n5-1) respondents rated how important each need is for their life (0 = not important

to 5 = very important). In second group items (n1-2, n2-2, n3-2, n4-2 and n5-2) then they rated how satisfied they are in that area ((0 = not satisfied at all to 5 = very satisfied; (appendix 1)).

For content validity, the draft version of items was presented to a five expert panel, and after some minor corrections, the final version was prepared. The importance (n<sub>(1,2,3,4,5)</sub>-1) and satisfaction (n<sub>(1,2,3,4,5)</sub> - 2) ratings for each item were multiplied to calculate the final score (N1 to N5) for each need. Therefore, we had finally one score for each need (totally five items). For assessment of test re-tests, reliability 80 participants refilled QOLSCT four weeks later.

Data were analysed using SPSS version 22 (for descriptive, reliability and correlation data analysis) and confirmatory factor analysis (CFA) was carried out to determine the QOLSCT structure. The LISREL program version 8.8 [43] was used for this analysis. This study used the Root Mean Squared Error of Approximation (RMSEA) [44], the Standardized Root Mean Squared Residual (SRMR), as well as the Comparative Fit Index (CFI). Hu and Bentler [45] recommend that good model fit is indicated when RMSEA < 0.05, SRMR < 0.08, and CFI > 0.95.

## Results

The sample size was 600 (293 females and 307 males). The mean age of the group was 28.62 years (SD = 7.34; range 18-53 years). The mean total score in QOLSCT was 70.83 ± 21.09 (71.73 ± 20 for female and 69.96 ± 22.08 for male). The descriptive statistics of the scale are presented in Table 1.

**Table 1: The descriptive statistics of the scale**

Items	Mean (SD)			T	Sig
	Female	Male	Total		
1-1	4.20 (0.79)	4.15 (0.85)	4.18 (0.82)	0.71	0.42
1-2	3.36 (0.97)	3.24 (1.0)	3.30 (0.99)	1.45	0.14
2-1	4.24 (0.76)	4.04 (0.95)	4.14 (0.87)	2.88	0.004
2-2	3.62 (1)	3.38 (1)	3.50 (1.00)	2.95	0.003
3-1	4.15 (0.81)	4.05 (0.92)	4.10 (0.87)	1.39	0.16
3-2	3.37 (1.0)	3.35 (0.95)	3.36 (0.98)	0.34	0.74
4-1	4.1 (0.83)	4.07 (0.93)	4.09 (0.88)	0.38	0.70
4-2	3.26 (1.06)	3.29 (1.04)	3.30 (1.05)	0.77	0.44
5-1	4.14 (0.87)	4.19 (1.4)	4.17 (1.19)	0.50	0.61
5-2	3.31 (1.06)	3.41 (1.05)	3.36 (1.06)	0.79	0.25
N1 (Survival)	14.31 (5.26)	13.70 (5.43)	14.00 (5.35)	1.29	0.16
N2 (Belonging)	15.69 (5.82)	14.01 (5.84)	14.83 (5.88)	3.53	0.0001
N3 (Power)	14.25 (5.5)	13.83 (5.53)	14.04 (5.51)	0.94	0.34
N4 (Freedom)	13.51 (5.56)	13.74 (5.79)	13.63 (5.67)	0.48	0.63
N5 (Fun)	13.95 (6.06)	14.68 (7.05)	14.33 (6.59)	1.35	0.18
Total	71.73 (20.01)	69.96 (22.08)	70.83 (21.09)	1.02	0.30

From the degree of important in life point of view (items 1-1, 2-1, 3-1, 4-1 and 5-1) the highest mean was for item 1-1 and the lowest mean was for 4-1 in total scores. Among the satisfaction items, the highest and lowest means were 3.50 (2-2) and 3.30 (1-2 and 4-2) respectively in total. The mean of final scores (important × satisfaction) ranged from 13.70 (N1) to 14.68 (N5). These sequences were changed

in some items when we look to scores according to gender (male and female).

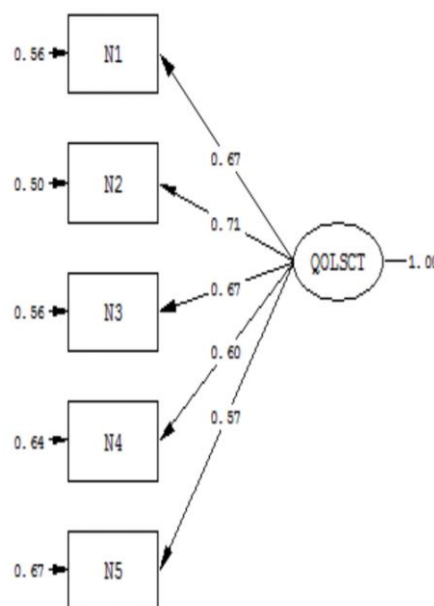
Data analysis with five items showed acceptable alpha values. Mean of inter-items correlation was 0.43 and for corrected item-total correlation was 0.55. For inter-item correlation, the highest was between N1 and N2 (0.51), and the lowest was between N2 and N5 (0.36). The highest and lowest means in corrected item-total correlation were N2 (0.59) and N5 (0.50) respectively. Cronbach's alpha, split-half and test re-test (one month) reliability scores were 0.78, 0.75, and 0.92 successively. Also, the correlation between items and total scores are presented in the same table. The highest and lowest correlations were between N1 and N2 (0.51) and N1 an N5 (.36) respectively.

**Table 2: inter items correlations and, Pearson correlations of QOLSCT with GHQ-28 and SF-36**

	N1	N2	N3	N4	N5	total
N2 <sup>1</sup>	0.508**					
N3 <sup>1</sup>	0.44**	0.47**				
N4 <sup>1</sup>	0.37**	0.39**	0.41**			
N5 <sup>1</sup>	0.36**	0.39**	0.37**	0.40**		
total <sup>1</sup>	0.72**	0.76**	0.73**	0.71**	0.72**	
GHQ-28 <sup>2</sup>	-0.004	-0.26**	-0.23**	-0.10	-0.06	-0.20*
SF-36 <sup>2</sup>	0.100	0.30**	0.39**	0.31**	0.14	0.31**

\* Significant at .05 level; \*\* Significant at .01 level; N1, N2, N3, N4, N5 are for survival, belonging, power, freedom and fun respectively.

Spearman correlations, used to evaluate convergent and divergent validity, are presented in Table 2. All items (except N1) and total scores of scale showed a positive and significant correlation with the SF-36 scale. The highest correlation is related to item N3 (0.39), and N1 (1) was at the bottom of these correlations. The total scores of the scale also showed a negative and significant correlation with GHQ-28 scores, as a divergent validity.



**Figure 1: Confirmatory Factor analysis based on the postulated model (Standardized factor loadings); N1-N5 are questionnaire Items; N = (important × satisfaction), quality of life scale based on choice theory (QOLSCT)**

The one-factor model showed satisfactory values of goodness-of-fit indices, despite a significant  $\chi^2$  ( $p < 0.02$ ). However, RMSEA, CFI, NFI and GFI were at an acceptable range, 0.05, 0.99, 0.99 and 0.99 respectively. Standardised factors loading and T values are presented in Figures 1 and 2.

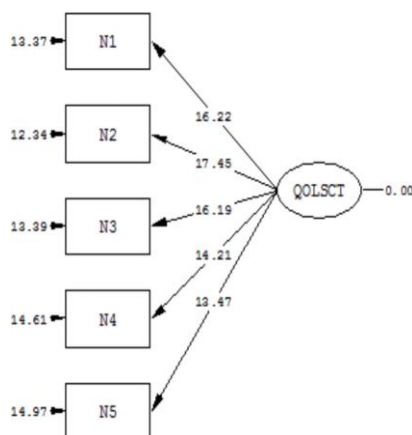


Figure 2: Confirmatory Factor analysis based on the postulated model (T values); N1-N5 are questionnaire Items; N = (important  $\times$  satisfaction), quality of life scale based on choice theory (QOLSCT)

All items loaded significantly on their original factors in the acceptable range [46], with the highest loading of item N2 (0.71) and the lowest loading of item N5 (0.57). All T values, as shown in Figure 2, were at significant ranges.

## Discussion

The current study was designed to construct a new model of quality of life scale based on choice theory concepts. Analysing the data, psychometric properties of this scale were evaluated. The scale was designed so that to consider an individual's differences in the degree of importance of each need.

The coefficient alpha for the total scale and the test-retest reliability coefficients all exceeded .75 that shows an acceptable range of reliability [46], [47], [48], [49], [50]. These results are in consistent with previous studies in this area [20], [23], [24], [26]. Also, the correlations between five needs scores all were at a significant level ( $P > 0.001$  and over). The strongest correlation was between N1 and N2, and the weakest was between N1 and N4.

In attention to RMSEA, CFI and NFI scores, the model showed well goodness of fit conceptual model. The acceptable scores in RMSE, CFI and NFI (according to MacCallum et al., [51], and acceptable loadings for all items on their factors, significant T values for all items and theoretical basic supported an appropriate fit for the model. In other words, all of the

indices supported a fair model for this scale with this structure. Although a significant  $\chi^2$  ( $p < 0.02$ ) resulted in the analysis, the large size of the sample could be accounted for this significant result [52], [53]. The strong loading values on confirmatory factor analysis and high and significant T-values supported the validity of scale items in the Iranian population.

Evidence for convergent validity of QOLSCT was supported by significant positive correlations between QOLSCT, and total scores of of-36 and negative correlation of total scores with GHQ-28 supported divergent validity for this scale. As would be expected, high scores in the QOLSCT scale were accompanied by high scores in of-36, and low scores were accompanied with high scores in GHQ-28. These results represent additional support for the postulated model, especially for validity.

This study contains limitations that are important to acknowledge. First, the population consisted of university students, and therefore cannot be generalised to other populations. Second, in the present study, we used convergent, divergent and factor analysis for assessment of scale validity. Therefore, it is recommended to use this scale for other population (especially clinical population) and assess by another type of validity methods (for example discriminate validity).

In conclusion, the result of the present study showed that the new version of quality of life scale based on choice theory (QOLSCT) could be confirmed. The strong reliability, fairly goodness of fit indexes, and very good convergent validity support this idea. In addition to construction a tool for clinical and research proposes based on choice theory and health quality of life research, the new method of calculating of scores (degree of importance and degree of satisfaction) could compensate the defects of previous quality of life scales. Also, the brief form of a scale (10 items) could respond to the increasing tendency toward this kind of scales [30], [31], [34]

### **Ethics approval and consent to participate**

The research proposal was approved in the research ethics committee of Yasuj University of Medical Sciences and accordance with the ethical standards of the 1964 Helsinki declaration. The reference letter is 23.2.1948. Informed consent was obtained from all individual participants included in the study.

### **Availability of data and materials**

The datasets used and analysed during the current study available from the corresponding author on reasonable request.

## Authors' contributions

AS was the main investigator, who designed the study, analysed the data and wrote the paper. SKh contributed to the study design and writing of the paper. MM contributed to the analysis of the data and writing the result of the manuscript. SM contributed to the analysis of data, helped in writing and contributed to the interpretation of the data. All authors read and approved the final manuscript.

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